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Estimates from a New Social Accounting Matrix

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Publication date:
2002

Document version
Early version, also known as pre-print

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Central Institute for
Economic Management

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DISCUSSION PAPERS IN ECONOMIC POLICY ANALYSIS

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Discussion Paper No. 0201

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ABSTRACT

Economic reforms and greater outward orientation are giving rise to extensive structural change in the Vietnamese economy. Because of the leverage that global markets can exert on an emerging economy, such adjustments will be particularly significant in the composition of domestic supply and demand. As domestic protection levels are reduced and external market access increases, trade growth and shifting trade patterns will have pervasive effects on income distribution in Vietnam. In this paper, we use a newly estimated Vietnam social accounting matrix to elucidate the links between trade and income in the country. With matrix decomposition methods, we show how the Vietnamese economy propagates the direct effects of external demand across the spectrum of domestic activities, factors, and households. This detailed analysis provides a blueprint for policies to improve economic participation of activities and households with relatively weak linkages to the rest of the economy.

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1. Introduction

Vietnamese economic reform, including more emphasis on participation in external markets, is expected to accelerate domestic growth and modernization and lead to substantial improvements in material living standards. Despite generally positive expectations about this process, however, it is reasonable to look more closely at its distributional consequences. History reminds us again and again that the aggregate welfare gains from partial or complete trade liberalization often mask compositional shifts which fall unequally on different groups in society.

To assess the distributional implications of Vietnam's commitment to trade growth, we use the social accounting matrix (SAM) as a universe of discourse. This disaggregated accounting device has been popularized in recent years as an elaboration of input-output methods, incorporating more extensive income and expenditure linkages and more flexible accounting conventions than its predecessor. The SAM provides closed form, economywide accounting of linkages between activities (and/or commodities), factors, households, domestic institutions (e.g. investment, government), and foreign institutions in a tabular format that is transparent and amenable to multiplier analysis similar to that popularized by Leontief.[1]

In this paper, we present results from a new Vietnam SAM, estimated for 1999.[2] To this we then apply multiplier decomposition methods that are designed to elucidate the linkages that arise within and between domestic groups in the process of economywide income generation. We appraise in particular the consequences of Vietnam's shifting import and export patterns, and more incidentally patterns of producer and consumer taxation, for the country's income distribution. Our results indicate that the real incidence of these differ significantly between households, depending upon their relative incomes and rural or urban status. It is apparent from these estimates that, in the absence of deliberately corrective fiscal measures, trade and other reforms will not realize their full potential for all Vietnamese households.

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[1] Background references on SAM methodology are Pyatt and Round (1985) and Reinert and Roland-Holst (1997)

[2] See Tarp, Rand, and Roland-Holst (2001) for complete documentation.

In the next section, we discuss the methodology for decomposing multipliers and using them for incidence analysis. Section 3 then discusses the Vietnam SAM and the basic results of the paper. The fourth and final section provides concluding remarks, policy implications, and some indications about how the present work might be extended.

2. Decomposition of Domestic Income and Expenditure Linkages

Empirical work on international trade has historically been divided between three areas, macroeconomic flow and adjustment models, partial equilibrium sector analysis and neoclassical approaches to economywide modeling. In this section, we take a slightly different approach, using accounting information directly to evaluate fixed-price linkages within Vietnam and with respect to its primary trading partners. This approach has the advantages of economywide consistency and transparency, although its lack of attention to price adjustments means the results should be interpreted carefully.

Consider the Vietnamese Economy as represented in the 1999 SAM in Table 2.1. In this table, twenty production activities are represented. These have been consolidated from 97 sector use and make tables for the same year. We also distinguish five types of Vietnamese households according to the location and occupational status of the household head. In addition to households, there are three enterprise accounts, representing private domestically owned firms, private foreign firms, and state owned enterprises (SOEs). We have consolidated out the factor accounts in the underlying input-output table with reduced form techniques like those discussed in Pyatt (1985), and therefore value added from production accrues directly to households and enterprises. In addition to the latter, there are five other domestic institutions, one for savings-investment activities and three government accounts delineating producer, consumer, and trade taxes and general government income and expenditure. The disaggregation of the main types of market taxes will clarify their incidence on domestic households and its distributional implications. The last group of accounts is for foreign trading partners, here disaggregated across five aggregated regions (ASEAN, other East Asia, Americas, EU, and ROW).

Table 2.1: Social Accounting Matrix for Vietnam, 1999

(billions of current Dong)

	A01Rice	A02Coffee	A03OthCrp	A04LivStk	A05OthAg	A06Fishry	A07Energy	A08OthMin	A09ProcFd	A10MatMfg	A11Chemcl	A12TechMfg	A13MachMfg	A14TxtAprl	A15OthInd	A16ElGsWat
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 A01Rice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2 A02Coffee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3 A03OthCrp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 A04LivStk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 A05OthAg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6 A06Fishry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 A07Energy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 A08OthMin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 A09ProcFd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 A10MatMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 A11Chemcl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 A12TechMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 A13MachMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14 A14TxtAprl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15 A15OthInd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
16 A16ElGsWat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 A17Construct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 A18TradeTrans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 A19PrivSrv	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 A20PubServ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21 C01Rice	14379	0	0	3225	0	0	0	0	35601	0	0	0	0	0	87	0
22 C02Coffee	0	28	0	0	0	0	0	0	252	0	0	0	0	0	0	0
23 C03OthCrp	43	2	7413	2410	11	6	0	0	5919	19	263	1	2	943	1128	0
24 C04LivStk	63	0	0	61	25	5	0	0	1468	1	1	0	0	22	2	0
25 C05OthAg	2990	81	366	687	4	76	54	41	3	4397	49	0	9	9	1	8
26 C06Fishry	0	0	0	264	0	2746	0	0	4643	0	275	0	0	0	0	0
27 C07Energy	88	1	17	108	0	11	500	36	43	719	240	20	29	24	8	188
28 C08OthMin	123	1	23	23	14	19	6	129	19	2267	375	0	296	14	119	12
29 C09ProcFd	506	2	27	33	102	120	2	324	5566	68	45	0	15	54	565	20
30 C10MatMfg	353	11	84	218	283	228	86	204	813	8948	450	135	232	587	409	40
31 C11Chemcl	8181	1557	736	372	101	330	608	1287	1294	1788	6859	1630	184	2066	5111	174
32 C12TechMfg	132	1	31	0	56	18	159	60	32	159	30	2085	147	59	153	1912
33 C13MachMfg	566	38	273	96	1406	178	156	3889	977	1105	421	454	7256	490	1285	674
34 C14TxtAprl	461	9	53	17	9	102	36	31	216	274	58	5	40	10555	391	177
35 C15OthInd	8	49	1443	2883	2925	1806	66	542	371	567	138	129	144	783	970	237

		A01Rice	A02Coffee	A03OthCr	A04LivStk	A05OthAg	A06Fishry	A07Energy	A08OthMi	A09ProcFc	A10MatMf	A11Chemc	A12TechM	A13MachN	A14TxtAp	A15OthInd	A16ElGsW
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
36	C16ElGsWat	99	9	72	65	274	77	115	463	792	1632	502	66	458	1304	245	1629
37	C17Construct	176	3	47	12	145	23	123	72	102	114	23	5	32	94	32	160
38	C18TradeTrans	1888	100	410	966	281	624	598	1628	13211	3086	1076	303	639	1654	708	258
39	C19PrivSrv	285	32	70	39	128	941	1087	1183	718	794	394	213	286	892	325	88
40	C20PubServ	163	8	30	10	28	21	10	27	132	79	34	16	46	91	28	46
41	L01UrbUnSkld	501	1016	8616	4811	2027	1663	1893	1145	4400	2634	1349	577	1946	1314	1740	6275
42	L02UrbMidSkld	5183	229	126	1269	134	991	912	324	1253	792	410	491	486	435	677	651
43	L03UrbHiSkld	696	46	671	233	29	194	205	79	257	214	118	95	156	128	192	140
44	L04RurUnSkld	12350	893	8253	4618	1942	7844	940	331	4629	1273	654	254	667	2951	1080	571
45	L05RurMidSkld	5170	194	45	1000	106	824	185	59	1046	293	177	105	197	805	285	130
46	L06RurHiSkld	628	41	478	209	26	174	45	12	243	87	54	39	67	258	87	47
47	Capital	1070	544	1136	693	105	1073	21632	901	7101	6263	1578	557	1566	5620	1736	2499
48	H01RurFarmer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	H02RurSelfEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	H03RurWage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	H04UrbSelfEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	H05UrbWage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	E01StateEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	E02PrivDomEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	E03PrivForEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	VAT	2527	222	1731	994	356	544	1339	110	1153	553	210	114	198	505	323	492
57	Mduty	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	Xduty	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	State	811	71	556	319	159	272	670	55	577	276	105	57	99	252	162	246
60	CapAcc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61	ASEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	OthEAsia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63	Americas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
64	EU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	59441	5188	32707	25634	10676	20913	31427	12933	92830	38403	15887	7351	15195	31910	17847	16674

Table 2.1:

		A17Constr	A18TradeT	A19PrivSr	A20PubSe	C01Rice	C02Coffee	C03OthCr	C04LivStk	C05OthAg	C06Fishry	C07Energy	C08OthMi	C09ProcFd	C10MatMf	C11Chemc	C12TechM
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	A01Rice	0	0	0	0	59441	0	0	0	0	0	0	0	0	0	0	0
2	A02Coffee	0	0	0	0	0	5188	0	0	0	0	0	0	0	0	0	0
3	A03OthCrp	0	0	0	0	0	0	32707	0	0	0	0	0	0	0	0	0
4	A04LivStk	0	0	0	0	0	0	0	25634	0	0	0	0	0	0	0	0
5	A05OthAg	0	0	0	0	0	0	0	0	10676	0	0	0	0	0	0	0
6	A06Fishry	0	0	0	0	0	0	0	0	0	20913	0	0	0	0	0	0
7	A07Energy	0	0	0	0	0	0	0	0	0	0	31427	0	0	0	0	0
8	A08OthMin	0	0	0	0	0	0	0	0	0	0	0	12933	0	0	0	0
9	A09ProcFd	0	0	0	0	0	0	0	0	0	0	0	0	92830	0	0	0
10	A10MatMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	38403	0	0
11	A11Chemcl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15887	0
12	A12TechMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7351
13	A13MachMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	A14TxtAprl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	A15OthInd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	A16ElGsWat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	A17Construct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	A18TradeTrans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	A19PrivSrv	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	A20PubServ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	C01Rice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	C02Coffee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	C03OthCrp	43	100	948	14	0	0	0	0	0	0	0	0	0	0	0	0
24	C04LivStk	92	596	396	45	0	0	0	0	0	0	0	0	0	0	0	0
25	C05OthAg	137	4	3	6	0	0	0	0	0	0	0	0	0	0	0	0
26	C06Fishry	0	0	191	0	0	0	0	0	0	0	0	0	0	0	0	0
27	C07Energy	168	140	81	31	0	0	0	0	0	0	0	0	0	0	0	0
28	C08OthMin	6960	219	239	101	0	0	0	0	0	0	0	0	0	0	0	0
29	C09ProcFd	917	1859	2515	541	0	0	0	0	0	0	0	0	0	0	0	0
30	C10MatMfg	18481	1198	1262	3444	0	0	0	0	0	0	0	0	0	0	0	0
31	C11Chemcl	2142	1389	2146	1270	0	0	0	0	0	0	0	0	0	0	0	0
32	C12TechMfg	1859	326	1229	380	0	0	0	0	0	0	0	0	0	0	0	0
33	C13MachMfg	2693	4877	5112	441	0	0	0	0	0	0	0	0	0	0	0	0
34	C14TxtAprl	1142	1082	454	303	0	0	0	0	0	0	0	0	0	0	0	0
35	C15OthInd	414	658	991	3649	0	0	0	0	0	0	0	0	0	0	0	0

		A17Constr	A18TradeT	A19PrivSr	A20PubSe	C01Rice	C02Coffee	C03OthCr	C04LivStk	C05OthAg	C06Fishry	C07Energy	C08OthMi	C09ProcFd	C10MatMf	C11Chemc	C12TechM
		17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
36	C16ElGsWat	141	298	5080	853	0	0	0	0	0	0	0	0	0	0	0	0
37	C17Construct	966	648	288	1113	0	0	0	0	0	0	0	0	0	0	0	0
38	C18TradeTrans	3136	8017	2059	1431	0	0	0	0	0	0	0	0	0	0	0	0
39	C19PrivSrv	2478	6952	8176	3501	0	0	0	0	0	0	0	0	0	0	0	0
40	C20PubServ	434	595	640	2684	0	0	0	0	0	0	0	0	0	0	0	0
41	L01UrbUnSkld	27757	9755	10309	14986	0	0	0	0	0	0	0	0	0	0	0	0
42	L02UrbMidSkld	2450	4226	2607	3898	0	0	0	0	0	0	0	0	0	0	0	0
43	L03UrbHiSkld	526	1206	974	963	0	0	0	0	0	0	0	0	0	0	0	0
44	L04RurUnSkld	728	17024	8968	6598	0	0	0	0	0	0	0	0	0	0	0	0
45	L05RurMidSkld	285	3806	2564	2345	0	0	0	0	0	0	0	0	0	0	0	0
46	L06RurHiSkld	196	1284	528	729	0	0	0	0	0	0	0	0	0	0	0	0
47	Capital	2893	22699	24371	2132	0	0	0	0	0	0	0	0	0	0	0	0
48	H01RurFarmer	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	H02RurSelfEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50	H03RurWage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51	H04UrbSelfEmp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	H05UrbWage	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
53	E01StateEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	E02PrivDomEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	E03PrivForEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	VAT	936	3019	2409	1464	133	24	73	4	119	95	558	46	654	431	106	43
57	Mduty	0	0	0	0	5	1	158	4	2	11	111	4	1568	661	1433	1465
58	Xduty	0	0	0	0	94	109	84	0	0	98	258	6	26	314	0	0
59	State	468	1510	1204	732	0	0	0	0	0	0	1000	0	0	0	0	0
60	CapAcc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
61	ASEAN	0	0	0	0	0	332	645	0	157	0	0	17	5462	3307	11166	8917
62	OthEAsia	0	0	0	0	0	2208	1580	0	18	0	0	14	1812	4019	15423	12705
63	Americas	0	0	0	0	0	0	476	0	21	0	0	1	223	534	1999	656
64	EU	0	0	0	0	0	63	748	0	30	0	0	2	583	713	4923	4040
65	ROW	0	0	0	0	0	34	1149	0	20	0	0	3	1228	435	2412	1655
	Total	78444	93488	85746	53657	59673	7958	37622	25643	11043	21117	33354	13025	104387	48816	53349	36833

Table 2.1:

		C13MachM	C14TxtApr	C15OthInd	C16ElGsW	C17Constr	C18TradeT	C19PrivSr	C20PubSer	L01UrbUn	L02UrbMi	L03UrbHi	L04RurUn	L05RurMi	L06RurHi	Capital	H01RurFa
		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1	A01Rice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	A02Coffee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	A03OthCrp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	A04LivStk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	A05OthAg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	A06Fishry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	A07Energy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	A08OthMin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	A09ProcFd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	A10MatMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	A11Chemcl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	A12TechMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	A13MachMfg	15195	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	A14TxtAprl	0	31910	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	A15OthInd	0	0	17846	0	0	0	0	0	0	0	0	0	0	0	0	0
16	A16ElGsWat	0	0	0	16674	0	0	0	0	0	0	0	0	0	0	0	0
17	A17Construct	0	0	0	0	78444	0	0	0	0	0	0	0	0	0	0	0
18	A18TradeTrans	0	0	0	0	0	93488	0	0	0	0	0	0	0	0	0	0
19	A19PrivSrv	0	0	0	0	0	0	85746	0	0	0	0	0	0	0	0	0
20	A20PubServ	0	0	0	0	0	0	0	53657	0	0	0	0	0	0	0	0
21	C01Rice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4545
22	C02Coffee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23	C03OthCrp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	916
24	C04LivStk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15633
25	C05OthAg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1090
26	C06Fishry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6620
27	C07Energy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1074
28	C08OthMin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	C09ProcFd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67951
30	C10MatMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3450
31	C11Chemcl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4897
32	C12TechMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7808
33	C13MachMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5869
34	C14TxtAprl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10968
35	C15OthInd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3520

		C13MachM	C14TxtApp	C15OthInd	C16ElGsW	C17Constr	C18TradeT	C19PrivSr	C20PubSer	L01UrbUn	L02UrbMi	L03UrbHi	L04RurUn	L05RurMi	L06RurHi	Capital	H01RurFa
		33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
36	C16ElGsWat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1772
37	C17Construct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38	C18TradeTrans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8197
39	C19PrivSrv	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25204
40	C20PubServ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20465
41	L01UrbUnSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	L02UrbMidSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	L03UrbHiSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	L04RurUnSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	L05RurMidSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	L06RurHiSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	Capital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	H01RurFarmer	0	0	0	0	0	0	0	0	70942	15936	0	60063	10813	0	0	0
49	H02RurSelfEmp	0	0	0	0	0	0	0	0	8805	1320	44	4631	985	40	0	0
50	H03RurWage	0	0	0	0	0	0	0	0	9161	0	54	5902	1188	47	0	0
51	H04UrbSelfEmp	0	0	0	0	0	0	0	0	9000	5858	4310	6817	3877	3173	0	0
52	H05UrbWage	0	0	0	0	0	0	0	0	6806	4430	2713	5156	2759	1974	0	0
53	E01StateEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50127	0
54	E02PrivDomEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26194	0
55	E03PrivForEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17118	0
56	VAT	46	130	115	92	237	852	682	58	0	0	0	0	0	0	0	0
57	Mduty	3178	3095	1602	1	0	0	0	0	0	0	0	0	0	0	0	0
58	Xduty	0	211	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	State	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12730	1240
60	CapAcc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5686
61	ASEAN	15117	2016	7077	143	0	1897	2915	176	0	0	0	0	0	0	0	0
62	OthEAsia	26327	22231	11722	1	0	3525	5417	328	0	0	0	0	0	0	0	0
63	Americas	1399	274	2126	0	0	243	373	23	0	0	0	0	0	0	0	0
64	EU	6692	942	1910	0	0	711	1093	66	0	0	0	0	0	0	0	0
65	ROW	4547	193	921	0	0	426	655	40	0	0	0	0	0	0	0	0
	Total	72500	61002	43319	16911	78681	101141	96880	54347	104714	27543	7122	82569	19621	5234	106169	196905

Table 2.1:

		H02RurSel	H03RurWa	H04UrbSel	H05UrbWa	E01StateEn	E02PrivDo	E03PrivFo	VAT	Mduty	Xduty	State	CapAcc	ASEAN	OthEAsia	Americas	EU
		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
1	A01Rice	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	A02Coffee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	A03OthCrp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	A04LivStk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	A05OthAg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	A06Fishry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	A07Energy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	A08OthMin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	A09ProcFd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	A10MatMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	A11Chemcl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	A12TechMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	A13MachMfg	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	A14TxtAprl	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	A15OthInd	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	A16ElGsWat	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	A17Construct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	A18TradeTrans	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	A19PrivSrv	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	A20PubServ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	C01Rice	148	152	285	212	0	0	0	0	0	0	0	1039	0	0	0	0
22	C02Coffee	0	0	0	0	0	0	0	0	0	0	0	0	475	607	1520	4112
23	C03OthCrp	957	987	49	8207	0	0	0	0	0	0	0	145	1599	2442	987	1338
24	C04LivStk	991	1022	1977	1449	0	0	0	0	0	0	0	828	35	511	207	48
25	C05OthAg	66	67	121	92	0	0	0	0	0	0	0	20	10	642	1	4
26	C06Fishry	439	453	858	635	0	0	0	0	0	0	0	22	241	2303	620	636
27	C07Energy	26	26	66	44	0	0	0	0	0	0	0	553	7902	8984	1731	680
28	C08OthMin	0	0	0	0	0	0	0	0	0	0	0	8	317	1223	1	34
29	C09ProcFd	3437	3878	2925	2143	0	0	0	0	0	0	0	1523	903	4564	2011	955
30	C10MatMfg	349	358	681	506	0	0	0	0	0	0	0	1238	154	2283	163	1748
31	C11Chemcl	400	410	765	645	0	0	0	0	0	0	0	1469	1473	1905	400	1138
32	C12TechMfg	1003	1034	1985	1454	0	0	0	0	0	0	0	7622	2296	2151	289	2094
33	C13MachMfg	637	750	1301	500	0	0	0	0	0	0	0	14441	4553	7851	893	2571
34	C14TxtAprl	457	471	1011	711	0	0	0	0	0	0	0	1323	2344	14160	1614	10601
35	C15OthInd	437	449	839	1180	0	0	0	0	0	0	0	1521	313	2560	1649	11079

		H02RurSel	H03RurWa	H04UrbSel	H05UrbWa	E01StateEn	E02PrivDo	E03PrivFo	VAT	Mduty	Xduty	State	CapAcc	ASEAN	OthEAsia	Americas	EU
		49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
36	C16ElGsWat	152	155	294	218	0	0	0	0	0	0	0	0	22	42	13	48
37	C17Construct	0	0	0	0	0	0	0	0	0	0	0	74502	0	0	0	0
38	C18TradeTrans	1517	1081	2062	1522	0	0	0	0	0	0	0	4248	6179	11858	3600	13495
39	C19PrivSrv	3316	3460	14997	2482	0	0	0	0	0	0	5415	0	2051	3937	1195	4480
40	C20PubServ	1523	1634	1165	588	0	0	0	0	0	0	20083	0	576	1105	335	1257
41	L01UrbUnSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
42	L02UrbMidSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
43	L03UrbHiSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	L04RurUnSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	L05RurMidSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	L06RurHiSkld	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	Capital	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
48	H01RurFarmer	0	0	0	0	13340	7835	0	0	0	0	17976	0	0	0	0	0
49	H02RurSelfEmp	0	0	0	0	1239	727	0	0	0	0	1669	0	0	0	0	0
50	H03RurWage	0	0	0	0	1280	752	0	0	0	0	1725	0	0	0	0	0
51	H04UrbSelfEmp	0	0	0	0	2611	1533	0	0	0	0	3518	0	0	0	0	0
52	H05UrbWage	0	0	0	0	1975	1160	0	0	0	0	2661	0	0	0	0	0
53	E01StateEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
54	E02PrivDomEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	E03PrivForEnt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	VAT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
57	Mduty	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
58	Xduty	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	State	115	119	243	184	7730	4581	5090	23700	13300	1200	0	0	0	0	0	0
60	CapAcc	3864	3992	10653	8057	21953	10590	15183	0	0	0	29183	0	0	0	0	0
61	ASEAN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	OthEAsia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63	Americas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
64	EU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	ROW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	19835	20496	42279	30828	50127	27177	20273	23700	13300	1200	82230	110503	31442	69129	17229	56317

Table 2.1:

		ROW 65	Total
1	A01Rice	0	59441
2	A02Coffee	0	5188
3	A03OthCrp	0	32707
4	A04LivStk	0	25634
5	A05OthAg	0	10676
6	A06Fishry	0	20913
7	A07Energy	0	31427
8	A08OthMin	0	12933
9	A09ProcFd	0	92830
10	A10MatMfg	0	38403
11	A11Chemcl	0	15887
12	A12TechMfg	0	7351
13	A13MachMfg	0	15195
14	A14TxtAprl	0	31910
15	A15OthInd	0	17847
16	A16ElGsWat	0	16674
17	A17Construct	0	78444
18	A18TradeTrans	0	93488
19	A19PrivSrv	0	85746
20	A20PubServ	0	53657
21	C01Rice	0	59673
22	C02Coffee	964	7958
23	C03OthCrp	730	37622
24	C04LivStk	164	25643
25	C05OthAg	5	11043
26	C06Fishry	169	21117
27	C07Energy	9817	33354
28	C08OthMin	481	13025
29	C09ProcFd	814	104387
30	C10MatMfg	423	48816
31	C11Chemcl	624	53349
32	C12TechMfg	267	36833
33	C13MachMfg	746	72500
34	C14TxtAprl	1928	61002
35	C15OthInd	999	43319

		ROW	
		65	Total
36	C16ElGsWat	19	16911
37	C17Construct	0	78681
38	C18TradeTrans	5310	101141
39	C19PrivSrv	1763	96880
40	C20PubServ	495	54347
41	L01UrbUnSkld	0	104714
42	L02UrbMidSkld	0	27543
43	L03UrbHiSkld	0	7122
44	L04RurUnSkld	0	82569
45	L05RurMidSkld	0	19621
46	L06RurHiSkld	0	5234
47	Capital	0	106169
48	H01RurFarmer	0	196905
49	H02RurSelfEmp	375	19835
50	H03RurWage	387	20496
51	H04UrbSelfEmp	1581	42279
52	H05UrbWage	1195	30828
53	E01StateEnt	0	50127
54	E02PrivDomEnt	984	27177
55	E03PrivForEnt	3154	20273
56	VAT	0	23700
57	Mduty	0	13300
58	Xduty	0	1200
59	State	2400	82230
60	CapAcc	1342	110503
61	ASEAN	-27901	31442
62	OthEAsia	-38200	69129
63	Americas	8881	17229
64	EU	33801	56317
65	ROW	12001	25717
	Total	25717	

Schematically, the Vietnam SAM can be partitioned as follows

$$S = \begin{bmatrix} S_{nn} & S_{nh} & S_{nd} & S_{nx} \\ S_{hn} & S_{hh} & S_{hd} & S_{hx} \\ S_{dn} & S_{dh} & S_{dd} & S_{dx} \\ S_{xn} & S_{xh} & S_{xd} & S_{xx} \end{bmatrix} \tag{2.1}$$

where the subscripts denote n activities (20), h households (5), d other domestic institutions (5), and x external institutions (5).

To evaluate economywide multiplier effects and linkages to external trade, first consider the expenditure shares[3]

$$A = \begin{bmatrix} A_{nn} & A_{nh} & A_{nd} & A_{nx} \\ A_{hn} & A_{hh} & A_{hd} & A_{hx} \\ A_{dn} & A_{dh} & A_{dd} & A_{dx} \\ A_{xn} & A_{xh} & A_{xd} & A_{xx} \end{bmatrix} \tag{2.2}$$

and define the additive decomposition

$$A_{-X} = B + C \tag{2.3}$$

where A_{-X} denotes the submatrix of A with only domestic institutions (n, h, and d) and

$$B = \begin{bmatrix} A_{nn} & 0 & 0 \\ 0 & A_{hh} & 0 \\ 0 & 0 & A_{dd} \end{bmatrix} \tag{2.4}$$

$$C = \begin{bmatrix} 0 & A_{nh} & A_{nx} \\ A_{hn} & 0 & A_{hx} \\ A_{dn} & A_{dh} & 0 \end{bmatrix} \tag{2.5}$$

[3] These are given as appendix tables below.

From standard accounting identities one then obtains

$$
\begin{aligned}
y &= Ay + x \\
&= By + Cy + x \\
&= (I - B)^{-1}Cy + (I - B)^{-1}x \\
&= [I - (I - B)^{-1}C]^{-1}(I - B)^{-1}x \\
&= (I - D)^{-1}(I - B)^{-1}x \\
&= (I - D^2)^{-1}(I + D)(I - B)^{-1}x \\
&= M_3M_2M_1x \\
&= Mx \qquad (2.6)
\end{aligned}
$$

where $D = (I - B)^{-1}C$, and

$$
M_1 = (I - B)^{-1} = \begin{bmatrix} (I - A_{nn})^{-1} & 0 & 0 \\ 0 & (I - A_{hh})^{-1} & 0 \\ 0 & 0 & (I - A_{dd})^{-1} \end{bmatrix} \qquad (2.7)
$$

is a matrix of domestic economywide multiplier effects. These are the standard multipliers from domestic production-factor-consumption linkages and could be further decomposed with methods proposed by Stone (1981) or Pyatt and Round (1979). The activity block in the upper left corner corresponds to the standard Leontief inverse. The second factor matrix details the so called direct or open loop linkages between domestic institutions, i.e.,

$$
M_2 = (I + D) = \begin{bmatrix} I & D_{nh} & D_{nx} \\ D_{hn} & I & D_{hx} \\ D_{dn} & D_{dh} & I \end{bmatrix} \qquad (2.8)
$$

where, e.g. $D_{nh} = (I - A_{hh})^{-1}A_{nh}$ defines cumulative unrequited outflows from production activities to households, taking account of the combined effects of

cumulative output effects (the Leontief inverse) and the value added payments to factor owning households (A_{nh}). Finally, closed loop effects are detailed in the third factor matrix

$$M_3 = (I - D^2)^{-1} = \begin{bmatrix} E_{nn} & E_{nh} & E_{nx} \\ E_{hn} & E_{hh} & E_{hx} \\ E_{dn} & E_{dh} & E_{dd} \end{bmatrix}$$

$$= \begin{bmatrix} I - D_{nh}D_{hn} - D_{nd}D_{dn} & D_{nd}D_{dh} & D_{nh}D_{hd} \\ D_{nd}D_{dh} & I - D_{hn}D_{nh} - D_{hd}D_{dh} & D_{hn}D_{nd} \\ D_{dn}D_{nh} & D_{dn}D_{nd} & I - D_{dn}D_{nd} - D_{dh}D_{hd} \end{bmatrix}^{-1} \quad (2.9)$$

This last factor matrix represents the income effects originating in one (column) institution, passing through trade linkages, and returning to the recipient row institution. The E_{ij} multipliers aggregate all the indirect income gains accruing between i and j from the existing pattern of domestic economic linkages.

The M_i matrices enter the decomposition multiplicatively and the contribution of each to economywide income generation is difficult to interpret directly. It is more transparent to use the additive component matrices

$$N_1 = M_1 \quad (2.10)$$

$$N_2 = (M_2 - I)M_1 \quad (2.11)$$

$$N_3 = (M_3 - I)M_2M_1 \quad (2.12)$$

which together satisfy $M = N_1 + N_2 + N_3$.

3. The Effects of Trade Growth on Vietnamese Income

In this section, we apply the above decomposition techniques to evaluate the effects of expanding Vietnamese trade, with particular reference to household income distribution and the role of government and savings. The appendix to this paper gives an exhaustive set of tables corresponding to all the factor matrices for the derivations

above. Here we discuss only general conclusions and selected examples to facilitate more detailed interpretation of all the results.

Before more detailed discussion of links between trade and household incomes, we present a few results to elucidate the multiplier decompositions. Table 3.1 presents the aggregate economywide SAM multiplier matrix. This is the matrix M from expression (2.6) and it is bordered by two matrices, termed Import and Export Dependence multipliers, respectively, of the form

$$M_M = [A_{x1}\ A_{x2}\ A_{x3}\ A_{x4}]\ M \tag{3.1}$$

$$M_E = M[A_{1x}\ A_{2x}\ A_{3x}\ A_{4x}]' \tag{3.2}$$

Columns of the import dependence multiplier matrix M_M detail the (reduced-form) composition of a one unit leakage from a domestic institution to external accounts, holding the observed pattern of import expenditure constant. These measure how much import demand (by origin) would be induced from a one unit increase in aggregate exports. Columns of the Export Dependence matrix M_E are averages of the respective rows of M, weighted by the expenditure shares for the foreign institution from the base SAM. In words, they measure the total income effect on each domestic row institution of a one unit increase in injections from the external account, holding composition constant.

Recall that the only exogenous accounts in this multiplier exercise are foreign institutions, so injections are interpreted in this case as currency units of export demand, remittances to households, or foreign transfers to domestic savings or government. Obviously, these two matrices can also be decomposed additively by substituting $M=N_1+N_2$. This decomposition of the dependence of domestic incomes on trade will be particularly instructive in the discussion below.

Table 3.1: Detailed Economywide Trade Multipliers for Vietnam (M), 1999

	A01 Rice 1	A02 Coffee 2	A03 OthCrp 3	A04 LivStk 4	A05 OthAg 5	A06 Fishry 6	A07 Energy 7	A08 OthMin 8	A09 ProcFd 9	A10 MatMfg 10	A11 Chemcl 11	A12 TechMfg 12	A13 MachMfg 13	A14 TxtAprl 14	A15 OthInd 15	A16 ElGsWat 16	A17 Cnstrct 17	A18 TradTrn 18	A19 PrivSrv 19	A20 PubServ 20	H01 RF 21
1 A01Rice	1.67	.31	.39	.53	.29	.39	.36	.25	.89	.30	.24	.20	.23	.28	.27	.35	.34	.38	.36	.38	.51
2 A02Coffee	.00	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3 A03OthCrp	.15	.13	1.41	.26	.13	.16	.15	.10	.22	.13	.12	.09	.09	.16	.18	.14	.14	.16	.16	.16	.16
4 A04LivStk	.16	.14	.17	1.17	.13	.17	.16	.11	.18	.13	.11	.09	.10	.13	.11	.16	.15	.17	.16	.17	.22
5 A05OthAg	.12	.06	.07	.09	1.05	.06	.06	.04	.08	.18	.04	.03	.04	.05	.04	.05	.08	.06	.06	.06	.07
6 A06Fishry	.10	.09	.11	.12	.08	1.26	.10	.07	.16	.09	.09	.06	.07	.08	.08	.10	.10	.11	.11	.11	.14
7 A07Energy	.02	.02	.02	.02	.02	.02	1.04	.02	.02	.04	.03	.02	.02	.02	.02	.03	.03	.02	.02	.02	.02
8 A08OthMin	.06	.05	.06	.06	.05	.06	.08	1.05	.06	.13	.07	.04	.06	.05	.05	.06	.16	.07	.07	.06	.05
9 A09ProcFd	.54	.48	.60	.57	.45	.60	.55	.39	1.60	.47	.37	.31	.35	.43	.42	.54	.52	.58	.56	.58	.78
10 A10MatMfg	.18	.16	.19	.19	.17	.20	.24	.15	.20	1.40	.16	.13	.14	.18	.16	.19	.40	.22	.21	.25	.19
11 A11Chemcl	.13	.16	.09	.09	.07	.08	.08	.09	.10	.09	1.20	.12	.05	.09	.15	.07	.08	.08	.08	.08	.09
12 A12TechMfg	.03	.03	.04	.03	.03	.04	.04	.03	.03	.03	.03	1.08	.03	.03	.03	.06	.04	.04	.04	.04	.04
13 A13MachMfg	.06	.05	.06	.06	.08	.06	.07	.12	.07	.07	.05	.05	1.15	.06	.06	.07	.07	.08	.08	.06	.06
14 A14TxtAprl	.08	.07	.08	.08	.06	.09	.08	.05	.08	.07	.06	.05	.05	1.27	.07	.08	.08	.09	.08	.08	.10
15 A15OthInd	.07	.06	.09	.11	.16	.11	.07	.06	.07	.08	.05	.04	.04	.06	1.07	.07	.06	.07	.07	.09	.07
16 A16ElGsWat	.09	.08	.09	.09	.10	.10	.10	.11	.10	.14	.10	.07	.09	.13	.08	1.19	.10	.10	.16	.11	.10
17 A17Cnstrct	.38	.36	.41	.39	.32	.41	.64	.31	.42	.42	.31	.26	.29	.39	.32	.42	1.39	.49	.48	.43	.38
18 A18TradTrn	.33	.29	.33	.35	.27	.35	.35	.34	.47	.38	.29	.23	.24	.31	.27	.31	.35	1.40	.33	.35	.36
19 A19PrivSrv	.43	.38	.46	.44	.35	.50	.48	.39	.45	.41	.32	.28	.30	.38	.33	.42	.44	.52	1.52	.51	.50
20 A20PubServ	.29	.26	.32	.30	.24	.31	.34	.21	.30	.27	.21	.18	.20	.25	.22	.29	.28	.32	.31	1.35	.36
21 H01RF	1.28	1.17	1.45	1.37	1.07	1.45	1.31	.86	1.30	1.10	.87	.74	.83	1.02	.93	1.29	1.22	1.34	1.27	1.37	2.08
22 H02RS	.12	.12	.14	.13	.11	.14	.13	.09	.13	.11	.09	.07	.08	.10	.09	.13	.13	.13	.13	.14	.11
23 H03RW	.12	.12	.15	.14	.11	.15	.13	.09	.13	.11	.09	.07	.09	.10	.09	.14	.13	.14	.13	.14	.11
24 H04US	.28	.24	.29	.28	.20	.29	.27	.18	.27	.22	.18	.17	.17	.21	.20	.25	.24	.28	.26	.29	.23
25 H05UW	.20	.17	.21	.20	.15	.21	.20	.13	.20	.16	.13	.12	.13	.15	.14	.19	.18	.21	.19	.21	.16
26 E01State	.20	.22	.22	.21	.17	.23	.54	.20	.25	.29	.21	.16	.19	.27	.20	.26	.23	.33	.34	.23	.22
27 E02PrivDom	.10	.11	.11	.11	.09	.12	.28	.10	.13	.15	.11	.09	.10	.14	.11	.14	.12	.17	.18	.12	.11
28 E03PrivFor	.07	.07	.07	.07	.06	.08	.18	.07	.09	.10	.07	.06	.06	.09	.07	.09	.08	.11	.12	.08	.07
29 VAT	.16	.14	.18	.16	.12	.15	.16	.09	.16	.13	.10	.08	.09	.11	.11	.14	.12	.15	.14	.14	.13
30 Mduty	.05	.05	.05	.05	.06	.05	.05	.05	.05	.05	.05	.05	.06	.06	.05	.05	.06	.05	.05	.05	.06
31 Xduty	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00
32 State	.41	.38	.44	.42	.34	.41	.60	.31	.44	.42	.32	.27	.29	.39	.33	.42	.38	.47	.47	.41	.38
33 CapAcc	.53	.51	.58	.55	.43	.58	.90	.43	.59	.58	.43	.37	.40	.54	.45	.59	.53	.68	.68	.57	.53
34 ASEAN	.30	.30	.29	.30	.30	.30	.30	.29	.30	.30	.30	.30	.29	.26	.30	.30	.30	.30	.30	.30	.30
35 OthEAsia	.46	.45	.46	.46	.47	.46	.46	.46	.46	.46	.44	.45	.47	.53	.45	.46	.46	.47	.46	.46	.46
36 Americas	.04	.04	.04	.05	.05	.04	.04	.04	.04	.04	.05	.04	.03	.04	.04	.04	.04	.04	.04	.04	.04
37 EU	.11	.12	.11	.11	.11	.11	.11	.12	.11	.11	.12	.12	.12	.10	.12	.11	.11	.11	.11	.11	.11
38 ROW	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.07	.08	.08	.08	.08	.08	.08	.08

Table 3.1:

		H02 RS 22	*H03 RW 23*	*H04 US 24*	*H05 UW 25*	*E01 State 26*	*E02 PrivDom 27*	*E03 PrivFor 28*	*VAT 29*	*Mduty 30*	*Xduty 31*	*State 32*	*CapAcc 33*	*ASEAN 34*	*OthEAsia 35*	*Americas 36*	*EU 37*	*ROW 38*
1	***A01Rice***	.39	.40	.34	.34	.37	.38	.31	.37	.37	.37	.37	.29	.27	.28	.33	.24	.32
2	***A02Coffee***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.06	.05	.03
3	***A03OthCrp***	.19	.19	.13	.42	.15	.15	.12	.15	.15	.15	.15	.11	.17	.15	.19	.13	.17
4	***A04LivStk***	.18	.18	.18	.18	.16	.17	.14	.16	.16	.16	.16	.13	.12	.12	.13	.10	.14
5	***A05OthAg***	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.06	.04	.06	.05	.04	.05
6	***A06Fishry***	.12	.12	.11	.11	.11	.11	.09	.11	.11	.11	.11	.08	.08	.11	.13	.08	.10
7	***A07Energy***	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.02	.26	.14	.11	.03	.38
8	***A08OthMin***	.06	.06	.07	.07	.09	.08	.10	.08	.08	.08	.08	.11	.06	.07	.05	.04	.08
9	***A09ProcFd***	.61	.62	.50	.51	.56	.57	.46	.56	.56	.56	.56	.43	.42	.44	.52	.37	.49
10	***A10MatMfg***	.21	.21	.22	.21	.25	.25	.29	.25	.25	.25	.25	.30	.16	.18	.17	.16	.20
11	***A11Chemcl***	.08	.08	.08	.08	.08	.08	.07	.08	.08	.08	.08	.07	.08	.07	.08	.07	.08
12	***A12TechMfg***	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.03	.03	.03	.03
13	***A13MachMfg***	.07	.07	.07	.07	.08	.08	.08	.07	.07	.07	.07	.09	.09	.08	.07	.06	.07
14	***A14TxtAprl***	.08	.08	.08	.08	.08	.08	.07	.08	.08	.08	.08	.07	.11	.19	.12	.17	.12
15	***A15OthInd***	.07	.07	.07	.08	.07	.07	.06	.07	.07	.07	.07	.06	.05	.07	.09	.13	.07
16	***A16ElGsWat***	.10	.10	.10	.09	.09	.09	.08	.10	.10	.10	.10	.08	.08	.08	.08	.07	.09
17	***A17Cnstrct***	.48	.48	.52	.51	.70	.68	.90	.62	.62	.62	.62	.99	.37	.34	.35	.29	.45
18	***A18TradTrn***	.38	.35	.34	.34	.34	.34	.32	.34	.34	.34	.34	.32	.44	.42	.47	.46	.49
19	***A19PrivSrv***	.53	.53	.70	.44	.45	.45	.39	.51	.51	.51	.51	.35	.40	.38	.42	.38	.47
20	***A20PubServ***	.32	.33	.27	.26	.32	.33	.30	.54	.54	.54	.54	.22	.25	.24	.26	.22	.30
21	***H01RF***	1.04	1.04	1.01	1.05	1.33	1.36	1.06	1.33	1.33	1.33	1.33	.97	.92	.90	.98	.82	1.09
22	***H02RS***	1.10	.10	.10	.10	.13	.13	.11	.13	.13	.13	.13	.10	.09	.09	.10	.08	.11
23	***H03RW***	.11	1.11	.10	.11	.14	.14	.11	.14	.14	.14	.14	.10	.09	.09	.10	.08	.11
24	***H04US***	.21	.21	1.21	.21	.27	.28	.21	.27	.27	.27	.27	.19	.19	.19	.20	.17	.23
25	***H05UW***	.16	.16	.15	1.15	.20	.20	.16	.20	.20	.20	.20	.14	.14	.13	.15	.12	.16
26	***E01State***	.21	.21	.23	.19	1.20	.20	.19	.21	.21	.21	.21	.19	.26	.23	.23	.19	.33
27	***E02PrivDom***	.11	.11	.12	.10	.11	1.11	.10	.11	.11	.11	.11	.10	.14	.12	.12	.10	.17
28	***E03PrivFor***	.07	.07	.08	.07	.07	.07	1.07	.07	.07	.07	.07	.06	.09	.08	.08	.06	.11
29	***VAT***	.12	.12	.12	.12	.11	.11	.11	1.12	.12	.12	.12	.10	.11	.11	.12	.10	.14
30	***Mduty***	.05	.05	.05	.05	.05	.05	.05	.05	1.05	.05	.05	.04	.05	.06	.06	.06	.05
31	***Xduty***	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.00	.00	.00	.01	.01	.01	.00	.01
32	***State***	.36	.36	.36	.35	.50	.51	.57	1.36	1.36	1.36	1.36	.31	.39	.36	.37	.31	.46
33	***CapAcc***	.68	.68	.74	.73	1.01	.97	1.29	.89	.89	.89	.89	1.43	.52	.48	.50	.41	.64
34	***ASEAN***	.30	.30	.30	.29	.30	.30	.29	.30	.30	.30	.30	.29					
35	***OthEAsia***	.46	.46	.47	.46	.46	.46	.46	.46	.46	.46	.46	.46					
36	***Americas***	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04	.04					
37	***EU***	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11					
38	***ROW***	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08	.08					

Generally speaking, the economywide SAM multipliers in Table 3.1 are typical of an economy with relatively low levels of market articulation. The dominance of the rural sector in domestic GDP, coupled with its weak links elsewhere in the economy, means that keynesian expenditure chains are relatively weak and short in the Vietnam economy.[4] One hopes that the current reform process will expand these domestic interactions since, as we shall see later, they are the primary engine of domestic income creation.

For those interested in detailed incidence analysis, these tables reward closer inspection, as would the corresponding estimates for the fully disaggregated Vietnam SAM (97 activities/commodities, 13 factors, 5 households). Such a meticulous analysis is outside the scope of the present discussion, however. Other salient features of the Table 3.1 economywide multipliers include the following:

Predominance of rural farm households (H01RF) as a beneficiary of most income linkages (rows 21-25). Since these people constitute over 70% of the population, this is not surprising. Their shares of total income generated through the multiplier process usually exceed this figure because of the subsistence nature of most domestic consumption.

A prominent role for state enterprises as beneficiaries of expenditure linkages (rows 26-28). These multiplier values are consistent with SOE shares of current GDP, but the reform process can be expected to shift this income to privately held enterprises and, from there, more directly to households.

The indirect tax revenue base for the economy is still relatively weak (rows 29-31). Note also that multipliers are significant for the State institution, which collects income and profit tax via direct deduction and transfer pricing.

The import leakage matrix indicates Vietnam's current heavy reliance on regional sources of imports (ASEAN+OtherEastAsia = about 75%). Given that about 47% of East Asia trade is intra-regional, one can expect Vietnam's increased outward orientation to divert import demand to other parts of the world.

[4] See Tarp and Roland-Holst (2001) on rural-urban dualism in Vietnam.

Finally, the export dependence submatrix, to the right of the multiplier matrix, indicates that export-induced income growth currently varies by sector, but not much across trading partners. This is because, as we shall see below, indirect linkages make up most of the aggregate income effect from this source of demand.

To give an interpretive example of the decomposition methods presented in the last section, we present the additive components of the aggregate multiplier matrix. Table 3.2 presents the first two additive factor matrices, displayed together since they have no nonzero elements in common. The first matrix N_1 (see expression 2.10 above) details own or within-group effects. Recalling that the upper left block in this table is the conventional Leontief inverse, we see interindustry multipliers in their usual magnitudes.[5] The household diagonal block is an identity matrix since the present 1999 SAM contains no data on inter-household transfers. The units off the diagonal in the domestic institution block correspond to net savings and the lump sum transfer of production and consumption taxes to government.

Away from the block diagonal entries (N1), open loop multiplier effects (N2) are in many cases significant, particularly for rural farm households with direct factor income linkages to agricultural sectors. Transfer effects to and from the state and capital accounts also represent important open linkages. Open loop links from households to activities (columns 21-25) represent direct consumption patterns and are roughly proportional to expenditure shares. In the open loop context, the import and export dependence submatrices also represent direct shares of external expenditure and income, respectively.

[5] Compare, for example, Leontief (1953).

Table 3.2: Own and Open-loop Multipliers (N1+N2)

	A01 Rice 1	A02 Coffee 2	A03 OthCrp 3	A04 LivStk 4	A05 OthAg 5	A06 Fishry 6	A07 Energy 7	A08 OthMin 8	A09 ProcFd 9	A10 MatMfg 10	A11 Chemcl 11	A12 TechMfg 12	A13 MachMfg 13	A14 TxtAprl 14	A15 OthInd 15	A16 ElGsWat 16	A17 Cnstrct 17	A18 TradTrn 18	A19 PrivSrv 19	A20 PubServ 20	H01 RF 21
1 A01Rice	1.32	.00	.00	.17	.01	.01	.00	.02	.54	.01	.00	.00	.00	.00	.02	.00	.01	.01	.02	.01	.21
2 A02Coffee	.00	1.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3 A03OthCrp	.00	.00	1.25	.11	.01	.01	.00	.01	.08	.00	.02	.00	.00	.04	.08	.00	.00	.01	.02	.01	.04
4 A04LivStk	.00	.00	.00	1.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.00	.09
5 A05OthAg	.07	.02	.01	.04	1.00	.01	.00	.01	.03	.14	.01	.00	.00	.00	.01	.00	.03	.00	.00	.01	.02
6 A06Fishry	.00	.00	.00	.01	.00	1.15	.00	.00	.06	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.06
7 A07Energy	.00	.00	.00	.01	.00	.00	1.02	.00	.00	.02	.02	.00	.00	.00	.00	.01	.01	.00	.00	.00	.01
8 A08OthMin	.01	.00	.00	.00	.01	.00	.00	1.02	.00	.08	.03	.00	.02	.00	.01	.00	.11	.01	.01	.01	.01
9 A09ProcFd	.01	.00	.00	.01	.01	.01	.00	.03	1.07	.01	.01	.00	.00	.01	.03	.00	.02	.02	.03	.01	.34
10 A10MatMfg	.01	.01	.01	.01	.03	.02	.00	.02	.02	1.24	.04	.02	.02	.03	.03	.01	.24	.02	.02	.07	.04
11 A11Chemcl	.06	.10	.01	.02	.02	.01	.01	.04	.03	.03	1.15	.08	.01	.03	.10	.01	.02	.01	.01	.02	.03
12 A12TechMfg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.06	.00	.00	.00	.03	.01	.00	.01	.00	.01
13 A13MachMfg	.01	.00	.00	.00	.03	.01	.00	.08	.01	.02	.01	.02	1.11	.01	.02	.01	.02	.02	.02	.01	.01
14 A14TxtAprl	.01	.00	.00	.00	.00	.00	.00	.00	.01	.01	.00	.00	.00	1.21	.02	.01	.01	.01	.00	.01	.04
15 A15OthInd	.01	.01	.03	.05	.12	.04	.00	.02	.01	.03	.01	.01	.01	.02	1.03	.01	.01	.01	.01	.03	.02
16 A16ElGsWat	.01	.01	.01	.01	.04	.01	.01	.05	.02	.07	.05	.02	.04	.06	.03	1.11	.02	.01	.07	.03	.03
17 A17Cnstrct	.01	.00	.00	.00	.02	.00	.00	.01	.01	.01	.00	.00	.00	.01	.00	.01	1.02	.01	.01	.02	.01
18 A18TradTrn	.05	.03	.02	.05	.04	.04	.02	.15	.18	.12	.09	.06	.06	.07	.06	.02	.08	1.10	.04	.04	.12
19 A19PrivSrv	.01	.01	.01	.01	.02	.06	.04	.11	.03	.05	.04	.04	.03	.04	.03	.01	.05	.08	1.10	.07	.15
20 A20PubServ	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	1.05	.11
21 H01RF	.40	.34	.48	.44	.34	.48	.10	.21	.36	.23	.20	.18	.20	.22	.24	.36	.37	.32	.27	.43	1.00
22 H02RS	.03	.03	.05	.04	.03	.04	.01	.02	.03	.02	.02	.02	.02	.02	.02	.04	.04	.03	.03	.04	.00
23 H03RW	.03	.04	.05	.04	.04	.05	.01	.02	.03	.02	.02	.02	.02	.02	.02	.04	.04	.03	.03	.04	.00
24 H04US	.10	.07	.09	.09	.05	.09	.02	.04	.08	.05	.04	.05	.05	.05	.05	.06	.07	.07	.06	.10	.00
25 H05UW	.07	.05	.06	.06	.04	.06	.02	.03	.06	.03	.03	.04	.03	.03	.04	.05	.05	.05	.04	.07	.00
26 E01State	.03	.06	.03	.03	.03	.05	.34	.08	.08	.14	.09	.06	.07	.13	.07	.09	.07	.14	.16	.05	.00
27 E02PrivDom	.01	.03	.01	.02	.01	.02	.18	.04	.04	.07	.04	.03	.04	.07	.04	.05	.03	.08	.09	.03	.00
28 E03PrivFor	.01	.02	.01	.01	.01	.02	.12	.03	.03	.05	.03	.02	.02	.04	.03	.03	.02	.05	.06	.02	.00
29 VAT	.07	.05	.07	.06	.04	.04	.05	.03	.06	.04	.03	.02	.02	.03	.03	.04	.03	.04	.04	.04	.00
30 Mduty	.01	.01	.01	.01	.02	.01	.00	.02	.01	.02	.02	.02	.03	.03	.02	.01	.01	.01	.01	.01	.01
31 Xduty	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
32 State	.11	.09	.11	.10	.09	.08	.16	.08	.11	.11	.08	.08	.08	.11	.09	.09	.08	.11	.11	.08	.02
33 CapAcc	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
34 ASEAN	.09	.11	.06	.08	.13	.07	.02	.14	.08	.10	.15	.17	.15	.07	.14	.08	.10	.06	.07	.08	.09
35 OthEAsia	.14	.15	.10	.12	.20	.11	.03	.23	.12	.15	.21	.25	.24	.24	.20	.13	.15	.09	.10	.12	.14
36 Americas	.01	.02	.01	.02	.02	.01	.00	.02	.01	.02	.02	.02	.01	.01	.02	.01	.01	.01	.01	.01	.01
37 EU	.04	.04	.03	.03	.04	.02	.01	.06	.03	.04	.06	.07	.06	.03	.06	.03	.04	.02	.03	.03	.03
38 ROW	.03	.03	.02	.02	.03	.02	.01	.04	.02	.02	.04	.04	.04	.02	.04	.02	.02	.02	.02	.02	.02

Table 3.2:

		H02 RS 22	H03 RW 23	H04 US 24	H05 UW 25	E01 State 26	E02 PrivDom 27	E03 PrivFor 28	VAT 29	Mduty 30	Xduty 31	State 32	CapAcc 33	ASEAN 34	OthEAsia 35	Americas 36	EU 37	ROW 38
1	A01Rice	.11	.11	.06	.05	.00	.00	.00	.00	.00	.00	.00	.03	.02	.04	.06	.02	.02
2	A02Coffee	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.06	.05	.02
3	A03OthCrp	.07	.08	.02	.30	.00	.00	.00	.00	.00	.00	.00	.01	.06	.05	.08	.04	.04
4	A04LivStk	.05	.05	.05	.05	.00	.00	.00	.00	.00	.00	.00	.01	.00	.01	.02	.00	.01
5	A05OthAg	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.02	.00	.02	.01	.01	.01
6	A06Fishry	.04	.04	.03	.03	.00	.00	.00	.00	.00	.00	.00	.00	.01	.04	.05	.02	.01
7	A07Energy	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.24	.13	.10	.01	.36
8	A08OthMin	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07	.01	.02	.00	.01	.02
9	A09ProcFd	.17	.19	.08	.07	.00	.00	.00	.01	.01	.01	.01	.03	.04	.07	.12	.03	.04
10	A10MatMfg	.03	.03	.03	.02	.00	.00	.00	.02	.02	.02	.02	.17	.02	.05	.02	.04	.03
11	A11Chemcl	.02	.02	.02	.02	.00	.00	.00	.00	.00	.00	.00	.02	.03	.02	.03	.03	.02
12	A12TechMfg	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.02	.02	.01	.00	.01	.00
13	A13MachMfg	.01	.02	.02	.01	.00	.00	.00	.00	.00	.00	.00	.05	.04	.03	.02	.02	.01
14	A14TxtAprl	.02	.02	.02	.02	.00	.00	.00	.00	.00	.00	.00	.02	.05	.13	.06	.12	.05
15	A15OthInd	.02	.02	.02	.03	.00	.00	.00	.01	.01	.01	.01	.01	.01	.03	.05	.09	.02
16	A16ElGsWat	.03	.03	.04	.02	.00	.00	.00	.01	.01	.01	.01	.02	.02	.02	.02	.02	.02
17	A17Cnstrct	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	.01	.68	.00	.00	.00	.00	.01
18	A18TradTrn	.12	.10	.08	.08	.00	.00	.00	.01	.01	.01	.01	.10	.22	.21	.25	.27	.24
19	A19PrivSrv	.18	.18	.36	.09	.00	.00	.00	.08	.08	.08	.08	.04	.10	.09	.10	.11	.11
20	A20PubServ	.08	.09	.03	.02	.00	.00	.00	.25	.25	.25	.25	.01	.03	.03	.03	.03	.03
21	H01RF	.00	.00	.00	.00	.27	.29	.00	.22	.22	.22	.22	.00	.18	.20	.23	.20	.19
22	H02RS	1.00	.00	.00	.00	.02	.03	.00	.02	.02	.02	.02	.00	.02	.02	.02	.02	.02
23	H03RW	.00	1.00	.00	.00	.03	.03	.00	.02	.02	.02	.02	.00	.02	.02	.02	.02	.02
24	H04US	.00	.00	1.00	.00	.05	.06	.00	.04	.04	.04	.04	.00	.04	.04	.05	.04	.04
25	H05UW	.00	.00	.00	1.00	.04	.04	.00	.03	.03	.03	.03	.00	.03	.03	.04	.03	.03
26	E01State	.00	.00	.00	.00	1.00	.00	.00	.00	.00	.00	.00	.00	.13	.10	.10	.08	.17
27	E02PrivDom	.00	.00	.00	.00	.00	1.00	.00	.00	.00	.00	.00	.00	.07	.05	.05	.04	.09
28	E03PrivFor	.00	.00	.00	.00	.00	.00	1.00	.00	.00	.00	.00	.00	.05	.04	.03	.03	.06
29	VAT	.00	.00	.00	.00	.00	.00	.00	1.00	.00	.00	.00	.00	.04	.04	.04	.03	.05
30	Mduty	.01	.01	.01	.01	.00	.00	.00	.00	1.00	.00	.00	.00	.02	.03	.02	.03	.02
31	Xduty	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.00	.00	.00	.00	.00	.00	.00	.00
32	State	.02	.02	.02	.02	.15	.17	.25	1.00	1.00	1.00	1.00	.00	.12	.11	.11	.09	.14
33	CapAcc	.19	.19	.25	.26	.44	.39	.75	.36	.36	.36	.36	1.00	.01	.01	.01	.01	.01
34	ASEAN	.09	.09	.09	.08	.04	.04	.04	.05	.05	.05	.05	.11					
35	OthEAsia	.14	.14	.14	.13	.07	.07	.06	.08	.08	.08	.08	.18					
36	Americas	.01	.01	.01	.01	.00	.00	.00	.01	.01	.01	.01	.01					
37	EU	.03	.03	.03	.03	.02	.02	.02	.02	.02	.02	.02	.04					
38	ROW	.02	.02	.02	.03	.01	.01	.01	.01	.01	.01	.01	.03					

Table 3.3: Closed Loop Multipliers (N3), Expressed as a Percent of of Total Multipliers (Mij)

	A01 Rice 1	A02 Coffee 2	A03 OthCrp 3	A04 LivStk 4	A05 OthAg 5	A06 Fishry 6	A07 Energy 7	A08 OthMin 8	A09 ProcFd 9	A10 MatMfg 10	A11 Chemcl 11	A12 TechMfg 12	A13 MachMfg 13	A14 TxtAprl 14	A15 OthInd 15	A16 ElGsWat 16	A17 Cnstrct 17	A18 TradTrn 18	A19 PrivSrv 19	A20 PubServ 20	H01 RF 21
1 A01Rice	21	100	100	68	97	99	100	94	39	98	98	99	99	99	91	100	97	97	95	98	58
2 A02Coffee	98	0	100	99	97	98	100	92	33	98	98	99	99	99	92	100	97	96	94	97	57
3 A03OthCrp	97	98	11	58	91	97	99	94	65	96	81	96	98	73	58	99	97	96	89	97	74
4 A04LivStk	99	100	100	14	98	99	100	98	89	99	99	99	99	99	99	100	98	95	96	99	60
5 A05OthAg	44	74	80	59	4	90	96	84	64	25	82	91	92	92	87	97	63	95	94	86	66
6 A06Fishry	98	98	100	89	99	9	100	96	62	99	75	97	99	99	95	100	98	98	95	99	59
7 A07Energy	85	90	95	79	91	94	2	73	87	42	42	71	80	86	82	61	71	90	89	88	67
8 A08OthMin	89	93	96	94	86	95	98	4	92	41	56	89	61	93	77	95	32	92	91	85	90
9 A09ProcFd	98	100	100	99	97	98	100	92	33	98	98	99	99	99	92	100	97	96	94	97	57
10 A10MatMfg	92	96	97	93	80	92	98	84	90	12	78	82	86	86	82	96	41	91	91	71	81
11 A11Chemcl	50	36	85	77	76	85	91	53	66	68	4	32	85	64	32	90	75	89	84	82	66
12 A12TechMfg	97	99	99	98	91	98	97	88	97	90	92	2	86	93	90	55	83	96	87	92	74
13 A13MachMfg	88	93	94	92	56	92	97	34	87	71	77	66	3	87	67	83	72	80	78	90	77
14 A14TxtAprl	91	97	98	96	95	94	99	92	92	89	92	96	94	5	78	90	85	90	94	93	61
15 A15OthInd	86	88	71	52	28	59	97	65	84	66	83	78	86	76	4	88	84	92	88	65	68
16 A16ElGsWat	89	90	94	91	64	89	92	50	82	50	54	72	56	52	70	7	75	88	52	74	68
17 A17Cnstrct	98	100	99	99	95	99	99	97	99	98	99	99	99	99	99	97	27	98	99	95	98
18 A18TradTrn	84	90	94	85	85	88	94	57	61	67	68	75	77	77	77	93	76	22	88	87	67
19 A19PrivSrv	97	97	99	98	94	89	92	73	93	89	87	87	91	89	91	98	88	84	28	85	70
20 A20PubServ	98	99	100	99	98	99	100	98	98	98	98	98	98	98	99	99	97	97	97	22	69
21 H01RF	69	71	67	68	68	67	92	76	72	79	76	76	75	79	75	72	70	76	78	69	52
22 H02RS	72	71	67	68	68	70	92	75	74	78	76	75	74	79	74	69	67	77	78	68	100
23 H03RW	73	70	65	68	66	68	92	75	74	78	76	78	75	79	75	69	67	77	78	68	100
24 H04US	65	72	70	68	74	70	91	75	70	79	75	70	74	78	73	75	73	74	78	67	100
25 H05UW	65	72	70	69	73	70	91	75	71	79	75	70	74	78	73	75	73	75	78	67	100
26 E01State	86	71	87	85	83	80	37	60	69	53	58	63	61	53	63	66	71	56	52	79	100
27 E02PrivDom	86	71	87	85	83	80	37	60	69	53	58	63	61	53	63	66	71	56	52	79	100
28 E03PrivFor	86	71	87	85	83	80	37	60	69	53	58	63	61	53	63	66	71	56	52	79	100
29 VAT	60	65	61	63	65	74	70	72	64	68	70	70	75	72	68	73	76	71	71	72	97
30 Mduty	82	78	89	83	63	87	96	56	83	72	62	51	52	57	62	81	75	88	85	85	78
31 Xduty	83	95	85	83	89	81	96	88	69	59	79	89	91	63	81	94	61	93	92	84	86
32 State	74	76	76	77	73	82	74	74	75	74	74	72	74	73	74	79	80	77	77	81	94
33 CapAcc	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	95
34 ASEAN	69	64	78	73	57	76	93	51	73	66	51	43	50	71	54	72	67	80	78	74	69
35 OthEAsia	70	67	78	73	57	76	93	51	74	68	54	45	48	55	55	73	67	80	78	74	69
36 Americas	67	60	71	66	50	73	93	53	71	64	46	46	57	69	49	77	67	82	79	72	69
37 EU	68	62	77	74	59	78	93	49	73	68	48	40	47	70	52	71	68	80	78	76	70
38 ROW	68	63	72	72	59	78	93	49	71	69	49	44	46	72	52	74	69	80	77	76	69
Average	80	80	84	79	76	83	87	71	75	72	72	73	76	77	73	81	75	83	81	81	77

Table 3.3:

		H02 RS 22	H03 RW 23	H04 US 24	H05 UW 25	E01 State 26	E02 PrivDom 27	E03 PrivFor 28	VAT 29	Mduty 30	Xduty 31	State 32	CapAcc 33	ASEAN 34	OthEAsia 35	Americas 36	EU 37	ROW 38
1	A01Rice	73	71	83	84	100	100	100	99	99	99	99	91	93	87	81	94	93
2	A02Coffee	72	70	84	86	100	100	100	99	99	99	99	94	6	10	1	1	3
3	A03OthCrp	61	61	86	28	100	100	100	99	99	99	99	94	62	67	58	69	73
4	A04LivStk	70	70	71	72	100	100	100	100	100	100	100	92	97	91	88	96	94
5	A05OthAg	77	76	82	79	100	100	100	96	96	96	96	64	90	69	83	83	89
6	A06Fishry	69	69	73	74	100	100	100	99	99	99	99	97	86	62	61	81	89
7	A07Energy	84	84	84	86	100	100	100	97	97	97	97	58	6	10	13	48	5
8	A08OthMin	93	93	94	95	100	100	100	97	97	97	97	35	77	65	91	85	71
9	A09ProcFd	72	70	84	86	100	100	100	99	99	99	99	94	92	84	77	92	92
10	A10MatMfg	85	85	87	88	100	100	100	92	92	92	92	43	90	75	86	73	86
11	A11Chemcl	74	73	77	76	100	100	100	94	94	94	94	69	65	67	64	60	73
12	A12TechMfg	71	71	72	74	100	100	100	98	98	98	98	57	61	75	84	70	89
13	A13MachMfg	79	78	79	87	100	100	100	97	97	97	97	48	53	55	70	66	79
14	A14TxtAprl	78	78	78	79	100	100	100	98	98	98	98	77	52	28	47	28	56
15	A15OthInd	70	70	74	64	100	100	100	88	88	88	88	75	81	62	48	29	69
16	A16ElGsWat	70	70	65	78	100	100	100	88	88	88	88	75	79	73	78	71	80
17	A17Cnstrct	99	99	99	99	100	100	100	99	99	99	99	31	99	99	99	99	99
18	A18TradTrn	67	71	76	77	100	100	100	96	96	96	96	68	49	50	47	41	52
19	A19PrivSrv	65	65	49	79	100	100	100	84	84	84	84	88	76	77	76	71	77
20	A20PubServ	74	74	88	92	100	100	100	52	52	52	52	97	88	88	88	85	89
21	H01RF	100	100	100	100	80	79	100	84	84	84	84	100	81	78	76	76	83
22	H02RS	9	100	100	100	81	80	100	85	85	85	85	100	81	79	77	76	83
23	H03RW	100	10	100	100	81	80	100	85	85	85	85	100	81	78	76	76	83
24	H04US	100	100	17	100	81	79	100	84	84	84	84	100	80	77	76	75	82
25	H05UW	100	100	100	13	80	79	100	84	84	84	84	100	80	78	76	75	82
26	E01State	100	100	100	100	17	100	100	100	100	100	100	100	50	55	58	60	47
27	E02PrivDom	100	100	100	100	100	10	100	100	100	100	100	100	50	55	58	60	47
28	E03PrivFor	100	100	100	100	100	100	6	100	100	100	100	100	50	55	58	60	47
29	VAT	97	97	97	98	100	100	100	11	99	99	99	100	66	67	66	68	66
30	Mduty	83	82	86	84	100	100	100	100	5	100	100	100	60	52	61	49	72
31	Xduty	89	89	92	80	100	100	100	100	100	0	100	100	49	48	47	48	43
32	State	95	95	95	95	69	67	56	26	26	26	26	100	69	69	71	70	70
33	CapAcc	71	71	66	64	56	60	42	60	60	60	60	30	98	98	98	98	98
34	ASEAN	70	70	71	73	86	86	87	83	83	83	83	62					
35	OthEAsia	71	70	70	71	86	86	86	83	83	83	83	61					
36	Americas	70	70	72	66	88	89	90	84	84	84	84	64					
37	EU	70	69	70	69	85	86	85	83	83	83	83	60					
38	ROW	70	69	71	66	86	86	86	83	83	83	83	63					
	Average	79	79	81	81	91	91	93	87	87	87	89	79					

Now examine the indirect, closed-loop effects N3 in Table 3.3, presented here as percentages of their corresponding economywide multiplier. The most arresting feature of this table is certainly the magnitude of these numbers, averaging 70-80% across all institutions in the economy. In the context of the Leontief inverse, for example, it becomes apparent (compare to the corresponding block in Table 3.1), however, that the omission of other domestic linkages seriously underestimates the economywide multiplier income accruing to domestic production activities. This is a general problem with restricting the scope of linkage analysis among domestic institutions, one which extended Leontief multipliers only partially correct.[6]

Table 3.3 makes clear the importance of an economywide perspective on trade policy. The magnitude of omissions resulting from considering only direct group effects can be seen here, where the percentage of cumulative indirect effects (N_3) in total multiplier effects (M) is presented. Clearly, some parts of the Vietnamese economy are highly articulated and a large part of trade-induced income generation is realized through long chains of expenditure linkages. Except for diagonal elements, where own effects dominate, a significant majority of domestically generated income is a product of the triangular cycle of production, demand, and savings/taxation. Of equal interest, however, are the more sparse areas of the loop-matrices, indicating weak linkages that could be more fully developed by a variety of government policies. Note especially that small loop effects are associated with rural activities and households that still enjoy only limited participation in the broader economy.

Note also that enterprise income and state revenue (rows 26-32) receive the vast majority of their inflows from indirect sources, regardless of the source of the original demand stimulus.[7] The implications of this for economic policy are inescapable.

The majority of benefits arising from policies committed to economic expansion, via export or other demand, arise not from the original target sector, but from the fabric of economic linkages in which it is embedded.

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[6] The estimation bias of restricted interindustry multipliers distorts both the level and the composition of effects to an extent which can render them seriously misleading to policy makers. This issue is treated in more detail in Roland-Holst (1990).

[7] A single exception is the enclave Energy sector, where only a third of enterprise income is indirect.

Policy makers relying on rules-of-thumb and targeting alone are very unlikely to anticipate the full consequences of their decisions.

Policies, like market reform, that are targeted at expanding and deepening endogenous linkages across the economy are the most likely to yield sustained benefits.

4. Conclusions

In this paper, we presented a new decomposition technique for SAM multipliers and applied it to data for the Vietnamese economy. The discussion above was focused on methodology with an extended example of how it can be used to interpret the effects of trade growth on relative incomes of Vietnamese households. This expository case and the more detailed information in the appendix support a number of conclusions.

Our analysis reveals the importance of indirect linkages in determining the ultimate relative and absolute income effects of external shocks. More traditional multiplier techniques, which make large parts of the domestic economy exogenous, can seriously bias both the level and composition of estimated effects. It is also clear that the degree of articulation of an institution within the economy is generally more important than its status as a direct target of external demand. For this reason, policy makers should focus their energies not on targeting, but on facilitating the enlargement and intensification of linkages across the economy. This is particularly important for economies at early stages of development, where many domestic institutions have weak links to the rest of the economy. It is even more important for transition economies, where the state is mediating interactions that could be supported by a much larger and more complex web of market interactions. Thus, we conclude that external opening is necessary, but not sufficient to realize the potential of new sources of demand for this economy. Domestic reform must open the economy internally, allowing the benefits of external injections to proliferate as far as possible.

This work can be extended in many directions. Most importantly, the 1999 SAM for Vietnam represents a rich new information set that can be mined with this and analogous methods to inform better economic policy. From a methodological

perspective, there are also a variety of directions in which to take the present work. Our choice of endogenous and exogenous institutions is to some extent arbitrary, as for that matter is the structure of our decomposition. Many alternatives are possible and interesting.[8] Two considerations are most important in any case. First, there must be sufficient endogeneity so that significant indirect effects will be transparent to policy analysts. Secondly, a secondary decomposition approach could be used to provide more detail on the sequencing and paths of interdependence.

[8] For examples of other decompositions, see e.g. Pyatt and Round (1979), Round (1985), Defourny and Thorbecke (1986), Reinert and Roland-Holst (1997), Roland-Holst and Sancho (1995), and Arndt, Jensen and Tarp (2000).

5. References

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6. Annex Tables

Table A1: A Matrix

	A01 Rice 1	A02 Coffee 2	A03 OthCrp 3	A04 LivStk 4	A05 OthAg 5	A06 Fishry 6	A07 Energy 7	A08 OthMin 8	A09 ProcFd 9	A10 MatMfg 10	A11 Chemcl 11	A12 TechMfg 12	A13 MachMfg 13	A14 TxtAprl 14	A15 OthInd 15	A16 ElGsWat 16	A17 Cnstrct 17	A18 TradTrn 18	A19 PrivSrv 19	A20 PubServ 20	H01 RF 21
1 A01Rice	.24	.00	.00	.13	.00	.00	.00	.00	.38	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02
2 A02Coffee	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3 A03OthCrp	.00	.00	.20	.08	.00	.00	.00	.00	.06	.00	.01	.00	.00	.03	.05	.00	.00	.00	.01	.00	.00
4 A04LivStk	.00	.00	.00	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.08
5 A05OthAg	.05	.02	.01	.03	.00	.00	.00	.00	.00	.11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
6 A06Fishry	.00	.00	.00	.01	.00	.13	.00	.00	.05	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
7 A07Energy	.00	.00	.00	.00	.00	.00	.01	.00	.00	.02	.01	.00	.00	.00	.00	.01	.00	.00	.00	.00	.01
8 A08OthMin	.00	.00	.00	.00	.00	.00	.00	.01	.00	.06	.02	.00	.02	.00	.01	.00	.09	.00	.00	.00	.00
9 A09ProcFd	.01	.00	.00	.00	.01	.01	.00	.02	.05	.00	.00	.00	.00	.00	.03	.00	.01	.02	.03	.01	.31
10 A10MatMfg	.00	.00	.00	.01	.02	.01	.00	.01	.01	.18	.02	.01	.01	.01	.02	.00	.19	.01	.01	.05	.01
11 A11Chemcl	.04	.09	.01	.00	.00	.00	.01	.03	.00	.01	.13	.07	.00	.02	.09	.00	.01	.00	.01	.01	.01
12 A12TechMfg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.06	.00	.00	.00	.02	.00	.00	.00	.00	.01
13 A13MachMfg	.00	.00	.00	.00	.03	.00	.00	.06	.00	.01	.01	.01	.10	.00	.02	.01	.01	.01	.01	.00	.01
14 A14TxtAprl	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.17	.01	.01	.01	.01	.00	.00	.03
15 A15OthInd	.00	.00	.02	.05	.11	.04	.00	.02	.00	.01	.00	.01	.00	.01	.02	.01	.00	.00	.00	.03	.01
16 A16ElGsWat	.00	.00	.00	.00	.03	.00	.00	.04	.01	.04	.03	.01	.03	.04	.01	.10	.00	.00	.06	.02	.01
17 A17Cnstrct	.00	.00	.00	.00	.01	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	.00	.02	.00
18 A18TradTrn	.03	.02	.01	.03	.02	.03	.02	.12	.13	.07	.06	.04	.04	.05	.04	.01	.04	.08	.02	.02	.04
19 A19PrivSrv	.00	.01	.00	.00	.01	.04	.03	.08	.01	.02	.02	.03	.02	.02	.02	.00	.03	.07	.08	.06	.11
20 A20PubServ	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	.05	.10
21 H01RF	.26	.30	.37	.31	.27	.38	.08	.10	.08	.09	.11	.12	.14	.12	.14	.31	.27	.25	.19	.34	.00
22 H02RS	.02	.03	.04	.03	.03	.03	.01	.01	.01	.01	.01	.01	.02	.01	.01	.04	.03	.02	.02	.04	.00
23 H03RW	.02	.03	.04	.03	.03	.04	.01	.01	.01	.01	.01	.01	.02	.01	.01	.04	.03	.02	.02	.04	.00
24 H04US	.07	.06	.07	.06	.04	.07	.02	.02	.02	.02	.02	.04	.03	.03	.03	.05	.04	.06	.04	.08	.00
25 H05UW	.05	.04	.05	.04	.03	.05	.01	.01	.01	.01	.02	.03	.02	.02	.02	.04	.03	.04	.03	.06	.00
26 E01State	.01	.05	.02	.01	.00	.02	.32	.03	.04	.08	.05	.04	.05	.08	.05	.07	.02	.11	.13	.02	.00
27 E02PrivDom	.00	.03	.01	.01	.00	.01	.17	.02	.02	.04	.02	.02	.03	.04	.02	.04	.01	.06	.07	.01	.00
28 E03PrivFor	.00	.02	.01	.00	.00	.01	.11	.01	.01	.03	.02	.01	.02	.03	.02	.02	.01	.04	.05	.01	.00
29 VAT	.04	.04	.05	.04	.04	.03	.04	.01	.02	.02	.02	.02	.01	.02	.02	.03	.02	.03	.03	.03	.00
30 Mduty	.00	.01	.00	.01	.02	.00	.00	.02	.00	.01	.01	.02	.02	.02	.02	.01	.01	.00	.01	.01	.01
31 Xduty	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
32 State	.02	.03	.02	.02	.02	.02	.10	.01	.02	.03	.02	.02	.02	.03	.02	.03	.01	.05	.05	.02	.01
33 CapAcc	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
34 ASEAN	.03	.07	.02	.03	.08	.02	.01	.10	.01	.04	.10	.13	.11	.04	.09	.04	.04	.02	.03	.03	.05
35 OthEAsia	.05	.09	.03	.04	.13	.04	.01	.16	.02	.05	.14	.19	.19	.16	.14	.06	.06	.04	.05	.04	.07
36 Americas	.01	.01	.01	.01	.02	.01	.00	.01	.00	.01	.02	.02	.01	.01	.02	.00	.01	.00	.00	.01	.00
37 EU	.01	.03	.01	.01	.03	.01	.00	.04	.01	.01	.04	.06	.05	.02	.04	.02	.01	.01	.01	.01	.02
38 ROW	.01	.02	.01	.01	.02	.00	.00	.03	.01	.01	.03	.03	.03	.01	.03	.01	.01	.01	.01	.01	.01

Table A1:

		H02	*H03*	*H04*	*H05*	*E01*	*E02*	*E03*										
		RS	*RW*	*US*	*UW*	*State*	*PrivDom*	*PrivFor*	*VAT*	*Mduty*	*Xduty*	*State*	*CapAcc*	*ASEAN*	*OthEAsia*	*Americas*	*EU*	*ROW*
		22	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*	*33*	*34*	*35*	*36*	*37*	*38*
1	***A01Rice***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00
2	***A02Coffee***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.06	.05	.02
3	***A03OthCrp***	.04	.04	.00	.23	.00	.00	.00	.00	.00	.00	.00	.00	.04	.03	.05	.02	.03
4	***A04LivStk***	.05	.05	.05	.05	.00	.00	.00	.00	.00	.00	.00	.01	.00	.01	.01	.00	.01
5	***A05OthAg***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00
6	***A06Fishry***	.02	.02	.02	.02	.00	.00	.00	.00	.00	.00	.00	.00	.01	.03	.04	.01	.01
7	***A07Energy***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.24	.12	.09	.01	.36
8	***A08OthMin***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.02	.00	.00	.02
9	***A09ProcFd***	.15	.17	.06	.06	.00	.00	.00	.00	.00	.00	.00	.01	.03	.06	.10	.02	.03
10	***A10MatMfg***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01	.00	.03	.01	.02	.01
11	***A11Chemcl***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	.01	.01
12	***A12TechMfg***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	.00	.01	.00
13	***A13MachMfg***	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00	.03	.03	.02	.01	.01	.01
14	***A14TxtAprl***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01	.04	.11	.05	.10	.04
15	***A15OthInd***	.01	.01	.01	.02	.00	.00	.00	.00	.00	.00	.00	.01	.00	.02	.04	.08	.02
16	***A16ElGsWat***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	***A17Cnstrct***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.67	.00	.00	.00	.00	.00
18	***A18TradTrn***	.07	.05	.05	.05	.00	.00	.00	.00	.00	.00	.00	.04	.18	.16	.19	.22	.19
19	***A19PrivSrv***	.15	.15	.31	.07	.00	.00	.00	.00	.00	.00	.06	.00	.06	.05	.06	.07	.06
20	***A20PubServ***	.08	.08	.03	.02	.00	.00	.00	.00	.00	.00	.24	.00	.02	.02	.02	.02	.02
21	***H01RF***	.00	.00	.00	.00	.27	.29	.00	.00	.00	.00	.22	.00	.00	.00	.00	.00	.00
22	***H02RS***	.00	.00	.00	.00	.02	.03	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00
23	***H03RW***	.00	.00	.00	.00	.03	.03	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00
24	***H04US***	.00	.00	.00	.00	.05	.06	.00	.00	.00	.00	.04	.00	.00	.00	.00	.00	.00
25	***H05UW***	.00	.00	.00	.00	.04	.04	.00	.00	.00	.00	.03	.00	.00	.00	.00	.00	.00
26	***E01State***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	***E02PrivDom***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	***E03PrivFor***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	***VAT***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	.00	.01
30	***Mduty***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01	.02	.02	.01	.02	.01
31	***Xduty***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
32	***State***	.01	.01	.01	.01	.15	.17	.25	1.00	1.00	1.00	.00	.00	.01	.00	.00	.00	.01
33	***CapAcc***	.19	.19	.25	.26	.44	.39	.75	.00	.00	.00	.35	.00	.00	.00	.00	.00	.00
34	***ASEAN***	.05	.05	.04	.04	.00	.00	.00	.00	.00	.00	.00	.05	.07	.06	.06	.07	.03
35	***OthEAsia***	.07	.07	.07	.07	.00	.00	.00	.00	.00	.00	.01	.08	.14	.16	.13	.19	.08
36	***Americas***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01	.01	.01	.01	.01	.01
37	***EU***	.02	.02	.02	.02	.00	.00	.00	.00	.00	.00	.00	.02	.03	.02	.02	.03	.01
38	***ROW***	.01	.01	.01	.02	.00	.00	.00	.00	.00	.00	.00	.01	.02	.02	.01	.02	.01

Table A2: C Matrix

	A01 Rice 1	A02 Coffee 2	A03 OthCrp 3	A04 LivStk 4	A05 OthAg 5	A06 Fishry 6	A07 Energy 7	A08 OthMin 8	A09 ProcFd 9	A10 MatMfg 10	A11 Chemcl 11	A12 TechMfg 12	A13 MachMfg 13	A14 TxtAprl 14	A15 OthInd 15	A16 ElGsWat 16	A17 Cnstrct 17	A18 TradTrn 18	A19 PrivSrv 19	A20 PubServ 20	H01 RF 21
1 A01Rice	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02
2 A02Coffee	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3 A03OthCrp	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4 A04LivStk	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.08
5 A05OthAg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
6 A06Fishry	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
7 A07Energy	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
8 A08OthMin	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9 A09ProcFd	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.31
10 A10MatMfg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
11 A11Chemcl	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
12 A12TechMfg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
13 A13MachMfg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
14 A14TxtAprl	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
15 A15OthInd	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
16 A16ElGsWat	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
17 A17Cnstrct	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18 A18TradTrn	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04
19 A19PrivSrv	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.11
20 A20PubServ	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10
21 H01RF	.26	.30	.37	.31	.27	.38	.08	.10	.08	.09	.11	.12	.14	.12	.14	.31	.27	.25	.19	.34	.00
22 H02RS	.02	.03	.04	.03	.03	.03	.01	.01	.01	.01	.01	.01	.02	.01	.01	.04	.03	.02	.02	.04	.00
23 H03RW	.02	.03	.04	.03	.03	.04	.01	.01	.01	.01	.01	.01	.02	.01	.01	.04	.03	.02	.02	.04	.00
24 H04US	.07	.06	.07	.06	.04	.07	.02	.02	.02	.02	.02	.04	.03	.03	.03	.05	.04	.06	.04	.08	.00
25 H05UW	.05	.04	.05	.04	.03	.05	.01	.01	.01	.01	.02	.03	.02	.02	.02	.04	.03	.04	.03	.06	.00
26 E01State	.01	.05	.02	.01	.00	.02	.32	.03	.04	.08	.05	.04	.05	.08	.05	.07	.02	.11	.13	.02	.00
27 E02PrivDom	.00	.03	.01	.01	.00	.01	.17	.02	.02	.04	.02	.02	.03	.04	.02	.04	.01	.06	.07	.01	.00
28 E03PrivFor	.00	.02	.01	.00	.00	.01	.11	.01	.01	.03	.02	.01	.02	.03	.02	.02	.01	.04	.05	.01	.00
29 VAT	.04	.04	.05	.04	.04	.03	.04	.01	.02	.02	.02	.02	.01	.02	.02	.03	.02	.03	.03	.03	.00
30 Mduty	.00	.01	.00	.01	.02	.00	.00	.02	.00	.01	.01	.02	.02	.02	.02	.01	.01	.00	.01	.01	.01
31 Xduty	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
32 State	.02	.03	.02	.02	.02	.02	.10	.01	.02	.03	.02	.02	.02	.03	.02	.03	.01	.05	.05	.02	.01
33 CapAcc	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03

Table A2:

		H02 RS 22	*H03 RW 23*	*H04 US 24*	*H05 UW 25*	*E01 State 26*	*E02 PrivDom 27*	*E03 PrivFor 28*	*VAT 29*	*Mduty 30*	*Xduty 31*	*State 32*	*CapAcc 33*
1	***A01Rice***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01
2	***A02Coffee***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	***A03OthCrp***	.04	.04	.00	.23	.00	.00	.00	.00	.00	.00	.00	.00
4	***A04LivStk***	.05	.05	.05	.05	.00	.00	.00	.00	.00	.00	.00	.01
5	***A05OthAg***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	***A06Fishry***	.02	.02	.02	.02	.00	.00	.00	.00	.00	.00	.00	.00
7	***A07Energy***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	***A08OthMin***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	***A09ProcFd***	.15	.17	.06	.06	.00	.00	.00	.00	.00	.00	.00	.01
10	***A10MatMfg***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01
11	***A11Chemcl***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00
12	***A12TechMfg***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01
13	***A13MachMfg***	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00	.03
14	***A14TxtAprl***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.01
15	***A15OthInd***	.01	.01	.01	.02	.00	.00	.00	.00	.00	.00	.00	.01
16	***A16ElGsWat***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00
17	***A17Cnstrct***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.67
18	***A18TradTrn***	.07	.05	.05	.05	.00	.00	.00	.00	.00	.00	.00	.04
19	***A19PrivSrv***	.15	.15	.31	.07	.00	.00	.00	.00	.00	.00	.06	.00
20	***A20PubServ***	.08	.08	.03	.02	.00	.00	.00	.00	.00	.00	.24	.00
21	***H01RF***	.00	.00	.00	.00	.27	.29	.00	.00	.00	.00	.22	.00
22	***H02RS***	.00	.00	.00	.00	.02	.03	.00	.00	.00	.00	.02	.00
23	***H03RW***	.00	.00	.00	.00	.03	.03	.00	.00	.00	.00	.02	.00
24	***H04US***	.00	.00	.00	.00	.05	.06	.00	.00	.00	.00	.04	.00
25	***H05UW***	.00	.00	.00	.00	.04	.04	.00	.00	.00	.00	.03	.00
26	***E01State***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	***E02PrivDom***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	***E03PrivFor***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	***VAT***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
30	***Mduty***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00
31	***Xduty***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
32	***State***	.01	.01	.01	.01	.15	.17	.25	.00	.00	.00	.00	.00
33	***CapAcc***	.19	.19	.25	.26	.44	.39	.75	.00	.00	.00	.35	.00

Table A3: D Matrix

	A01 Rice 1	A02 Coffee 2	A03 OthCrp 3	A04 LivStk 4	A05 OthAg 5	A06 Fishry 6	A07 Energy 7	A08 OthMin 8	A09 ProcFd 9	A10 MatMfg 10	A11 Chemcl 11	A12 TechMfg 12	A13 MachMfg 13	A14 TxtAprl 14	A15 OthInd 15	A16 ElGsWat 16	A17 Cnstrct 17	A18 TradTrn 18	A19 PrivSrv 19	A20 PubServ 20	H01 RF 21
1 A01Rice	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.21
2 A02Coffee	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3 A03OthCrp	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04
4 A04LivStk	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09
5 A05OthAg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02
6 A06Fishry	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.06
7 A07Energy	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
8 A08OthMin	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
9 A09ProcFd	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.34
10 A10MatMfg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04
11 A11Chemcl	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
12 A12TechMfg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
13 A13MachMfg	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
14 A14TxtAprl	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04
15 A15OthInd	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02
16 A16ElGsWat	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03
17 A17Cnstrct	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
18 A18TradTrn	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.12
19 A19PrivSrv	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.15
20 A20PubServ	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.11
21 H01RF	.26	.30	.37	.31	.27	.38	.08	.10	.08	.09	.11	.12	.14	.12	.14	.31	.27	.25	.19	.34	.00
22 H02RS	.02	.03	.04	.03	.03	.03	.01	.01	.01	.01	.01	.01	.02	.01	.01	.04	.03	.02	.02	.04	.00
23 H03RW	.02	.03	.04	.03	.03	.04	.01	.01	.01	.01	.01	.01	.02	.01	.01	.04	.03	.02	.02	.04	.00
24 H04US	.07	.06	.07	.06	.04	.07	.02	.02	.02	.02	.02	.04	.03	.03	.03	.05	.04	.06	.04	.08	.00
25 H05UW	.05	.04	.05	.04	.03	.05	.01	.01	.01	.01	.02	.03	.02	.02	.02	.04	.03	.04	.03	.06	.00
26 E01State	.01	.05	.02	.01	.00	.02	.32	.03	.04	.08	.05	.04	.05	.08	.05	.07	.02	.11	.13	.02	.00
27 E02PrivDom	.00	.03	.01	.01	.00	.01	.17	.02	.02	.04	.02	.02	.03	.04	.02	.04	.01	.06	.07	.01	.00
28 E03PrivFor	.00	.02	.01	.00	.00	.01	.11	.01	.01	.03	.02	.01	.02	.03	.02	.02	.01	.04	.05	.01	.00
29 VAT	.04	.04	.05	.04	.04	.03	.04	.01	.02	.02	.02	.02	.01	.02	.02	.03	.02	.03	.03	.03	.00
30 Mduty	.00	.01	.00	.01	.02	.00	.00	.02	.00	.01	.01	.02	.02	.02	.02	.01	.01	.00	.01	.01	.01
31 Xduty	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
32 State	.07	.08	.08	.06	.07	.05	.15	.04	.03	.06	.05	.06	.06	.07	.06	.07	.03	.08	.08	.05	.02
33 CapAcc	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03

Table A3:

		H02 RS 22	*H03 RW 23*	*H04 US 24*	*H05 UW 25*	*E01 State 26*	*E02 PrivDom 27*	*E03 PrivFor 28*	*VAT 29*	*Mduty 30*	*Xduty 31*	*State 32*	*CapAcc 33*
1	***A01Rice***	.11	.11	.06	.05	.00	.00	.00	.00	.00	.00	.00	.03
2	***A02Coffee***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	***A03OthCrp***	.07	.08	.02	.30	.00	.00	.00	.00	.00	.00	.00	.01
4	***A04LivStk***	.05	.05	.05	.05	.00	.00	.00	.00	.00	.00	.00	.01
5	***A05OthAg***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.02
6	***A06Fishry***	.04	.04	.03	.03	.00	.00	.00	.00	.00	.00	.00	.00
7	***A07Energy***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
8	***A08OthMin***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.07
9	***A09ProcFd***	.17	.19	.08	.07	.00	.00	.00	.00	.00	.00	.01	.03
10	***A10MatMfg***	.03	.03	.03	.02	.00	.00	.00	.00	.00	.00	.02	.17
11	***A11Chemcl***	.02	.02	.02	.02	.00	.00	.00	.00	.00	.00	.00	.02
12	***A12TechMfg***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.02
13	***A13MachMfg***	.01	.02	.02	.01	.00	.00	.00	.00	.00	.00	.00	.05
14	***A14TxtAprl***	.02	.02	.02	.02	.00	.00	.00	.00	.00	.00	.00	.02
15	***A15OthInd***	.02	.02	.02	.03	.00	.00	.00	.00	.00	.00	.01	.01
16	***A16ElGsWat***	.03	.03	.04	.02	.00	.00	.00	.00	.00	.00	.01	.02
17	***A17Cnstrct***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.68
18	***A18TradTrn***	.12	.10	.08	.08	.00	.00	.00	.00	.00	.00	.01	.10
19	***A19PrivSrv***	.18	.18	.36	.09	.00	.00	.00	.00	.00	.00	.08	.04
20	***A20PubServ***	.08	.09	.03	.02	.00	.00	.00	.00	.00	.00	.25	.01
21	***H01RF***	.00	.00	.00	.00	.27	.29	.00	.00	.00	.00	.22	.00
22	***H02RS***	.00	.00	.00	.00	.02	.03	.00	.00	.00	.00	.02	.00
23	***H03RW***	.00	.00	.00	.00	.03	.03	.00	.00	.00	.00	.02	.00
24	***H04US***	.00	.00	.00	.00	.05	.06	.00	.00	.00	.00	.04	.00
25	***H05UW***	.00	.00	.00	.00	.04	.04	.00	.00	.00	.00	.03	.00
26	***E01State***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	***E02PrivDom***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	***E03PrivFor***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	***VAT***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
30	***Mduty***	.01	.01	.01	.01	.00	.00	.00	.00	.00	.00	.00	.00
31	***Xduty***	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
32	***State***	.02	.02	.02	.02	.15	.17	.25	.00	.00	.00	.00	.00
33	***CapAcc***	.19	.19	.25	.26	.44	.39	.75	.00	.00	.00	.35	.00